FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)
217829US0PCT	10/030103

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP00/08342	27 November 2000	29 November 1999

TITLE OF INVENTION
ELECTRONIC COMPONENT PACKAGING CONTAINER

APPLICANT(S) FOR DO/EO/US
MIYAKAWA Takeshi et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☐ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Form PTO-1449
Request for Priority
PCT/IB/304
PCT/IB/308

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/030103	PCT/JP00/08342	217829US0PCT

24. The following fees are submitted:.		CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :			
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	**$1040.00**		
☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	**$890.00**		
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	**$740.00**		
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	**$710.00**		
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)	**$100.00**		
ENTER APPROPRIATE BASIC FEE AMOUNT =		**$890.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).		**$0.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	11 - 20 =	0	x $18.00	**$0.00**	
Independent claims	3 - 3 =	0	x $84.00	**$0.00**	
Multiple Dependent Claims **(check if applicable).**			☐	**$0.00**	

TOTAL OF ABOVE CALCULATIONS =	**$890.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.	**$0.00**	
SUBTOTAL =	**$890.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +	**$0.00**	
TOTAL NATIONAL FEE =	**$890.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐	**$0.00**	
TOTAL FEES ENCLOSED =	**$890.00**	
Amount to be: refunded	$	
charged	$	

a. ☒ A check in the amount of **$890.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **15-0030** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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REGISTRATION NUMBER

Jan 17 2002
DATE

217829US-0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :

TAKESHI MIYAKAWA ET AL : ATTN: APPLICATION DIVISION

SERIAL NO: NEW U.S. PCT APPLN :
(Based on PCT/JP00/08342)

FILED: HEREWITH :

FOR: ELECTRONIC COMPONENT :
PACKAGING CONTAINER

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to examination on the merits, please amend the above-identified application as follows.

IN THE CLAIMS

Please amend the claims as shown on the marked-up copy following this amendment to read as follows.

3. (Amended) The electronic component packaging container according to Claim 1, which has an antistatic treatment applied to one or both sides.

7. (Amended) An electronic component packaging container which comprises the sheet as defined in Claim 4.

8. (Amended) The electronic component packaging container according to Claim 1, which is a carrier tape.

Please add the following new claims.

10. (New) The electronic component packaging container according to Claim 7, which is a carrier tape.

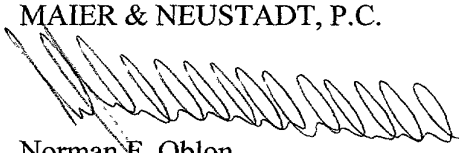
11. (New) A packaged product of an electronic component, wherein the electronic component is stored in the carrier tape as defined in Claim 10 and heat-sealed with a cover tape.

REMARKS

Claims 1-11 are active in the present application. Claims 3, 7 and 8 have been amended to remove multiple dependencies. Claims 10 and 11 are new claims. Support for the new claims is found in the original claims. No new matter is added. An action on the merits and allowance of claims is solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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Marked-Up Copy
Serial No:

Amendment Filed on:
1-17-02

IN THE CLAIMS

Please amend the claims as follows.

--3. (Amended) The electronic component packaging container according to Claim 1 [or 2], which has an antistatic treatment applied to one or both sides.

7. (Amended) An electronic component packaging container which comprises the sheet as defined in [any one of Claims 4 to 6] Claim 4.

8. (Amended) The electronic component packaging container according to [any one of Claims 1, 2, 3 and 7] Claim 1, which is a carrier tape.--

Claims 10-11 (New).

10/030103
JC13 Rec'd PCT/PTO 17 JAN 2002

DESCRIPTION

ELECTRONIC COMPONENT PACKAGING CONTAINER

TECHNICAL FIELD

The present invention relates to an electronic component packaging container and a sheet useful therefor.

BACKGROUND ART

As a material for an electronic component packaging container such as a tray or a carrier tape, a polyvinyl chloride (PVC) resin, a polyethylene terephthalate (PET) resin, a styrene type copolymer resin, a polycarbonate type resin or the like may be used depending upon their properties. Among carrier tapes, particularly for applications for storing electronic components sensitive to static electricity, classified into semiconductors such as IC, antistatic properties are required to protect the electronic components against static electricity, and resins having carbon black incorporated into the above-described resins are used.

Electrical components have further been miniaturized, and it has been attempted to mount electronic components at a higher speed, and accordingly as electronic component packaging containers ones having more excellent mechanical strength have been required. The present invention is to provide an electronic component packaging container to accomplish such objects.

DISCLOSURE OF THE INVENTION

Namely, the present invention resides in an electronic component packaging container which uses a multilayer polyester sheet having a base layer comprising a polyethylene terephthalate type resin and a polycarbonate type resin, and a surface layer comprising a polycarbonate type resin formed on at least one side of the base layer. A sheet having such a construction has been reported to be useful for food applications, particularly as packaging containers and cap materials for prepared food to be heated or defrosted by e.g. a microwave oven, in JP-A-11-77938, but surprisingly, it is particularly useful also as an electronic component packaging container.

BEST MODE FOR CARRYING OUT THE INVENTION

Now, the present invention will be explained in detail.

The electronic component packaging container of the present invention is one comprising a multilayer polyester sheet having a base layer comprising a polyethylene terephthalate type resin and a polycarbonate type resin, and a surface layer comprising a polycarbonate type resin, formed on at least one side of the base layer.

The base layer contains a polyethylene terephthalate type resin and a polycarbonate type resin. It preferably contains from 70 to 97 wt% of a polyethylene

terephthalate type resin and from 3 to 30 wt% of a polycarbonate type resin based on the total amount of the polyethylene terephthalate type resin and the polycarbonate type resin. If the compounding ratio of the polycarbonate type resin is low, impact resistance at a low temperature tends to decrease, and if it is high, transparency and cloudiness tend to decrease. Transparency is necessary in a case where the state of an electronic component such as IC which is a product to be packaged in the container is visually observed from the outside. The balance between strength and transparency is excellent within a range of the polyethylene terephthalate type resin of from 70 to 97 wt% and the polycarbonate type resin of from 3 to 30 wt%. From the viewpoint of the transparency and the cloudiness, the transparency is preferably at least 85% and the cloudiness is preferably at most 15% in order to visually observe the state of a packaged product from the outside. The state of the electronic component in the container can be visually observed from the outside within these ranges.

The polyethylene terephthalate type resin may be one obtained mainly from ethylene glycol and terephthalic acid or its dimethyl ester, and in addition, as a copolymerizable monomer, diethylene glycol, 1,4-tetramethylene glycol, 1,4-cyclohexanedimethanol or heptanemethylene glycol in a case of a glycol component,

or isophthalic acid, 1,5-naphthalene dicarboxylic acid or adipic acid in a case of a dicarboxylic acid component, may, for example, be used as a substitution for a part of the monomer. Preferably, a polyethylene terephthalate type resin having from 0.1 to 10 mol% of a 1,4-cyclohexane dimethanol component as a glycol component copolymerized, or a polyethylene terephthalate type resin having from 1 to 10 mol% of an isophthalic acid component as an acid component copolymerized, is preferably used in view of formability and transparency.

More preferred is a polyethylene terephthalate type resin having from 1 to 10 mol% of a 1,4-cyclohexane dimethanol component as a glycol component copolymerized, since it tends to be slowly crystallized and it has a good impact strength. A copolymerized product having a molar ratio higher than the above range is unfavorable since its crystallization is extremely slow, thus causing fusion or blocking phenomenon in extrusion step, drying step or recycling step, or decreasing physical properties of the formed product.

Further, one having an intrinsic viscosity [η] measured at 30°C when the polyethylene terephthalate type resin is dissolved in a mixed solvent of 1,1,4,4-tetrachloroethane and phenol (in a weight ratio of 60:40) (hereinafter referred to as IV value), within a range of from 0.6 dℓ/g to 1.0 dℓ/g, is preferably used. If it is less than 0.6 dℓ/g, the sheet or the formed product tends

to have an insufficient mechanical strength and is likely to fracture, and if it exceeds 1.0 dℓ/g, the melt viscosity tends to be high and extrudability tends to be poor, and productivity tends to be poor, such being unfavorable.

The polycarbonate type resin to be used in the present invention is one made mainly of bisphenol and produced by a phosgene method or an ester exchange method. The material bisphenol includes e.g. 2,2-bis-(4-hydroxyphenyl)propane (bisphenol A), 2,4-bis-(4-hydroxyphenyl)methyl-butane and 1,1-bis-(4-hydroxyphenyl)-cyclohexane. Further, it may be a homopolycarbonate, a copolycarbonate having a carboxylic acid copolymerized or a mixture thereof.

In the base layer, a method of blending the polyethylene terephthalate type resin with the polycarbonate type resin is not particularly limited, and either of a method of directly introducing a stirred and mixed material into an extruder at the time of sheet forming, and a method of fusion-mixing a stirred and mixed material in a monoaxial or biaxial extruder to obtain pellets, and using them at the time of sheet extrusion, may be employed.

The constitutional ratio of the multilayer polyester sheet is preferably such that the proportion of the surface layer of the polycarbonate type resin laminated on the base is from 10 to 30% of the entire sheet. If it

is less than 10%, the heat resistance tends to decrease, and if it exceeds 30%, post-formability tends to decrease, such being unfavorable economically. The thickness is suitably from 0.1 to 1.5 mm, more preferably from 0.2 to 1.0 mm.

A sheet comprising a base layer containing a polyethylene terephthalate type resin and a polycarbonate type resin, and a surface layer containing a polycarbonate type resin formed on at least one side of the base layer, wherein the base layer contains from 70 to 97 wt% of the polyethylene terephthalate type resin and from 3 to 30 wt% of the polycarbonate type resin based on the total amount of the polyethylene terephthalate type resin and the polycarbonate type resin, and the thickness of the surface layer is from 10 to 30% of the total thickness, which is an electrically conductive sheet further having a coating layer of an electrically conductive coating on at least one side of the surface layer, is suitably used for an electronic component packaging container. Here, the electrically conductive coating is a coating containing carbon black and/or an antistatic agent. The electrically conductive coating may further contain e.g. a resin content or a solvent. As the resin content, an acrylic type resin, a polyester type resin or a polyurethane type resin may, for example, be used. As the solvent, an ester type such as ethyl acetate or butyl acetate, an alcohol type such

as methanol, ethanol or isopropyl alcohol, a hydrocarbon type such as toluene or xylene or a mixed solvent thereof, and in addition, water or a mixed solvent of water and an alcohol type may, for example, be used. Particularly when water or a mixed solvent of water and an alcohol type is used, decrease in sheet physical properties due to solvent at the time of coating can be suppressed.

The carbon black is not particularly limited, but one having an average particle size of less than 50 μm, a specific surface area of from 50 to 1,300 m^2/g and a DBP oil absorption of from 80 to 500 g/100 g is preferably used.

As the antistatic agent, a commercially available anionic antistatic agent, cationic antistatic agent, ampholytic antistatic agent or nonionic antistatic agent, and in addition, a metal type oxide such as SnO_2/Sb type, In_2O_3/Sn type or ZnO/AZ type, or an electrically conductive high polymer molecule such as polypyrrol, polythiophene or polyaniline, may, for example, be used, and use of a high polymer antistatic agent is preferred in a case where a particularly long-term antistatic effect is required. The high polymer antistatic agent may, for example, be a polyether type, a polyether ester amide type, a polyamide type or a siloxane type.

The content of each component in the electrically conductive coating is not particularly limited, but one

having from 1 to 50 wt% of the resin content, from 1 to 20 wt% of the carbon black or the antistatic agent and from 35 to 90 wt% of the solvent may be used.

The electronic component packaging container of the present invention is obtained by firstly producing a multilayer polyester sheet having a base layer and a surface layer, followed by forming. As the method of producing the multilayer polyester sheet, it can easily be produced, for example, by coextrusion by means of a T-die method employing a multi-manifold method or a feed block method by plural conventional extruders. In such a case, the polycarbonate type resin layers constituting the base layer and the surface layer are strongly bonded to each other in a fused state, and accordingly they can easily be laminated without using an adhesive layer, but of course an adhesive may be used.

The coating layer can be obtained by coating the electrically conductive coating on at least one side of the surface layer, followed by drying. The coating method is not particularly limited and a known method may be employed. For example, a gravure coating method, a roll coating method, a dip coating method or a spray method may be mentioned. It is allowed to apply a corona discharge treatment or a primer treatment by means of another coating agent to the sheet coated surface as the case requires. It is preferred to adjust the coating amount and the thickness of the coating layer so that its

surface specific resistance is within a range of from 10^4 to 10^{14} Ω. No adequate protective properties of an electronic component against static electricity can be obtained if the surface specific resistance is beyond this range. The specific thickness varies depending upon the type of the electrically conductive coating, but is preferably within a range of from 0.5 to 10 μm. If it is less than 0.5 μm, no adequate electrical conductivity can be obtained after formed as an electronic component packaging container, and if it exceeds 10 μm, sheet properties such as formability tends to be greatly influenced.

For the multilayer polyester sheet, various additives may be incorporated into the base layer or the surface layer as the case requires. The additive may, for example, be a coloring agent, a pigment, a dye, an antistatic agent, an ultraviolet absorber, an energy extinction agent, a light dispersing agent, a fluorescent brightening agent, an antioxidant, a heat stabilizer, a slipping agent, an anti-block agent, a filler, a delustering agent or a fire retardant. Further, a known resin may be added to the base layer or the surface layer if its amount is small. As the polyethylene terephthalate type resin, a polycarbonate type resin and the electrically conductive coating, a commercially available one may be used. For the base layer, a selvage or a misroll of a main sheet generated at the time of

sheet production or a pulverized product of a formed product may be recycled in an amount of from 5 to 50 wt%.

An antistatic treatment may be applied to the surface of the multilayer polyester sheet as the case requires. As the antistatic treatment method, various known methods may be employed such as a method of coating an antistatic agent and a method of laminating a resin having an antistatic agent incorporated thereinto. By applying the antistatic treatment to the surface, effects of preventing attachment or fling of a minute electronic component due to static electricity can be obtained when the sheet is used as a packaging container.

An electronic component packaging container having a free shape can be obtained from the above-described sheet by utilizing a known method of forming a sheet such as vacuum forming, air-pressure forming or pressing. This container is excellent in heat resistance, transparency and mechanical strength and is thereby used suitably as a carrier tape for packaging of particularly minute components (also called embossed carrier tape). The carrier tape is useful for packaging of an electronic component such as IC. The electronic component is stored in a pocket portion of the carrier tape, and the surface of the carrier tape is heat-sealed with a cover tape. As the cover tape, a commercially available one may be used as it is.

Now, the present invention will be explained in

further detail with reference to Examples.

Evaluation methods

Physical properties were measured as follows under an environmental condition of 23°C in a humidity of 50% unless otherwise specified. Further, with respect to optical properties and impact strength, evaluation results in accordance with a standard in a sheet shape which is more common than a formed product are shown.

(1) Total light transmittance and surface cloudiness

A sample for measuring was cut out from a sheet and a formed product in each of Examples and Comparative Examples, and measurement was carried out in accordance with JIS K-7105 by means of a turbidimeter manufactured by Nippon Denshoku Industries Co., Ltd.

(2) Impact strength

A sample was cut out from a sheet in each of Examples and Comparative Examples, and measurement was carried out by means of a Du Pont type impact tester manufactured by Toyo Seiki Seishaku-sho, LTD. by using a half inch hemispherical impact core and loads of 500 g and 1 kg at an environmental temperature of 23°C. The results are shown by a 50% impact fracture energy (unit: J) as defined in JIS-K7211.

(3) Post-formability

A carrier tape having a width of 24 mm was prepared from a sheet of each of Examples and Comparative Examples by means of a carrier tape forming machine (manufactured

by EDG) to evaluate the formability.

○: good

△: slightly poor

×: poor

(4) Heat resistance

A formed product formed from a sheet of each of Examples and Comparative Examples was subjected to a heat treatment at 90°C, 100°C or 110°C for 10 minutes by means of a fine oven DH62, manufactured by YAMATO, and the degree of deformation and change in transparency were visually observed and evaluated in accordance with the following evaluation standards.

○: no deformation

△: not deformed but whitened

×: deformed

EXAMPLE 1

As a material for a base, one having a polyethylene terephthalate (hereinafter referred to as PET) resin (PET 9921, manufactured by Eastman, IV value=0.80) and a polycarbonate (hereinafter referred to as PC) resin (Iupilon S-3000, manufactured by Mitsubishi Engineering-Plastics Corporation) blended in a proportion as identified in Table 1 and stirred and mixed was used, and as a material for a surface layer to be formed on the base, a PC resin was used, and they were dried so that the water content would be 50 ppm by means of humidifying driers PD-30DAM and P-50DS, respectively, manufactured by

KAWATA MFG Co., Ltd.

Then, the material for both surface layers and the material for the base were simultaneously extruded by means of a 40 mm monoaxial extruder manufactured by CHIYODA SEIKI CO., LTD. and a 65 mm monoaxial extruder manufactured by CHIYODA SEIKI CO., LTD., respectively, at an extrusion temperature within a range of from 260 to 300°C and the respective fused resins were combined by means of a two-types three-layers feed block manufactured by Sanwa Nuts Industries, Ltd. (thickness slit ratio 1:10:1) and extruded by a T-dies having a width of 700 mm to prepare a three-layer sheet having a thickness of 0.50 mm and a thickness ratio of the sheet of 1 (surface layer) : 9 (base layer) : 1 (surface layer) by quenching rolls.

EXAMPLES 2 and 3 and COMPARATIVE EXAMPLES 1 to 4

A three-layer sheet was prepared in the same manner as in Example 1 except that the composition was changed as identified in Table 1.

Results of measurement of the total light transmittance, cloudiness and impact strength of these sheets are shown in Table 1. With respect to the total light transmittance and cloudiness, no significant change was observed until the content of the PC resin in the base became 30 parts by weight, but the cloudiness greatly decreased when the content became higher than 30 parts by weight.

This sheet was formed by a carrier tape machine, and post-formability was evaluated, and the results are shown in table 1. The formability slightly decreased when the content of the PC resin in the base became higher than 30 parts by weight.

Further, the heat resistances of the formed products were compared and the results are shown in Table 2. The formed product became whitened and its transparency disappeared at 110°C if the content of the PC resin in the base was less than 5 parts by weight, whereas when the content of the PC resin was at least 5 parts by weight, the formed product did not whiten.

COMPARATIVE EXAMPLES 5 and 6

A PET resin and a PC resin were extruded from both two extruders of Example 1 to prepare single-layer sheets having a thickness of 0.5 mm. Evaluation was carried out in the same manner. The PET resin single-layer sheet has good transparency and post-formability but is significantly poor in impact strength at a low temperature and heat resistance. The PC resin single-layer sheet has good transparency, impact strength and heat resistance but is significantly poor in post-formability.

EXAMPLES 4 and 5 and COMPARATIVE EXAMPLES 7 and 8

A sheet was prepared in the same manner as in each Example by using the same resin composition as in Example 2 (90 parts by weight of a PET resin and 10 parts by

weight of a PC resin) as the base layer and 100 parts by weight of a PC resin as both surface layers with a sheet constitution ratio of three layers in two types as illustrated in Table 3. The post-formability of the sheet and the heat resistance of the formed product were evaluated and the results are shown in Table 3. When the both surface layers are higher than 30%, the post-formability decreases, when they are less than 10%, the heat resistance decreases, and when the both surface layers are 5%, deformation takes place at 110°C.

Table 1

		Examples			Comparative Examples					
		1	2	3	1	2	3	4	5	6
Base layer	PC resin	5	10	30	0	5	40	50	0	100
	PET resin	95	90	70	100	95	60	50	100	0
Both surface layers	PC resin	100	100	100	100	100	100	100	-	-
Total light transmittance (%)		89	88.9	88.1	90	90	88.5	88.8	90	90.6
Cloudiness (%)		2.2	2.6	6.1	1	1.2	15	22	1	1
Du Pont impact strength (J)		1.96	1.91	2.18	1.96	1.95	2.15	2.16	1.84	2.4

Table 2

		Examples			Comparative Examples					
		1	2	3	1	2	3	4	5	6
Post-formability		○	○	○	○	○	△	△	○	×
Heat resistance	90°C	○	○	○	○	○	○	○	×	○
	100°C	○	○	○	○	○	○	○	×	○
	110°C	○	○	○	△	△	○	○	×	○

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Table 3

		Examples		Comparative Examples			
		4	5	5	6	7	8
Constitution ratio	Surface layer (wt%)	5	15	0	0	2.5	20
	Base layer (wt%)	90	70	100	0	95	60
	Surface layer (wt%)	5	15	0	100	2.5	20
Post-formability		○	○	○	×	○	×
Heat resistance	90°C	○	○	×	○	○	○
	100°C	○	○	×	○	○	○
	110°C	○	○	×	○	×	○

EXAMPLE 6

An electrically conductive coating comprising 36 wt% of a methyl methacrylate-methacrylic acid ester copolymer, 4 wt% of carbon black (Balcan XC-72, manufactured by Cabot) and 60 wt% of an isopropyl alcohol/ethyl acetate mixed solvent (9/1) as a solvent was coated on both sides of the sheet of Example 1 by a gravure coating method, followed by drying to provide a coating layer having a thickness of 4 μm.

EXAMPLE 7

The same operation as in Example 6 was carried out except that an antistatic agent (Chemistat 3100, manufactured by SANYO KASEI CO., LTD.) was used instead of the carbon black.

The surface specific resistance and impact strength of the sheets of Examples 6 and 7 were measured. Further, each of these sheets was formed by a carrier tape machine, and the post-formability was evaluated. The results are shown in Table 4. Each sheet had good surface specific resistance, impact strength and formability.

Table 4

		Examples	
		6	7
Base layer	PC resin	5	5
	PET resin	95	95
Both surface layers	PC resin	100	100
Surface specific resistance (Ω)		1×10^4	1×10^{10}
Du Pont impact strength (J)		1.90	1.87
Post-formability		○	○

An IC was stored in the carrier tape of each Example and heat-sealed with a Thermofilm ALS (manufactured by Denki Kagaku Kogyo K.K.) as a commercially available cover tape. Since the carrier tapes of Examples 1 to 5 are excellent in transparency, it is possible to observe the state of the stored IC from the outside. The carrier tape having an IC stored therein and sealed with a cover tape was subjected to an automatic mounting apparatus. The cover tape was separated without trouble and the IC could be taken out without any problem. The carrier tape of the present invention showed good results as a packaging material for an electronic component such as IC.

INDUSTRIAL APPLICABILITY

An electronic component packaging container having a base layer comprising a polyethylene terephthalate type resin and a polycarbonate type resin and a surface layer

comprising a polycarbonate type resin, is excellent in strength, heat resistance, formability, transparency and cloudiness and is useful as a carrier tape. Further, an electrically conductive sheet having a coating layer of an electrically conductive coating containing carbon black and/or an antistatic agent formed on at least one side of a multilayer polyester sheet having a base layer comprising a polyethylene terephthalate type resin and a polycarbonate type resin and a surface layer comprising a polycarbonate type resin formed on at least one side of the base layer, is excellent in strength, formability and antistatic properties, and is useful for an electrical component packaging container, particularly for a carrier tape.

CLAIMS

1. An electronic component packaging container which uses a multilayer polyester sheet comprising a base layer containing a polyethylene terephthalate type resin and a polycarbonate type resin and a surface layer containing a polycarbonate type resin, formed on at least one side of the base layer, wherein the base layer contains from 70 to 97 wt% of the polyethylene terephthalate type resin and from 3 to 30 wt% of the polycarbonate type resin based on the total amount of the polyethylene terephthalate type resin and the polycarbonate type resin, and the thickness of the surface layer is from 10 to 30% of the total thickness.

2. The electronic component packaging container according to Claim 1, wherein the multilayer polyester sheet has a total light transmittance of at least 85% and a cloudiness of at most 10%.

3. The electronic component packaging container according to Claim 1 or 2, which has an antistatic treatment applied to one or both sides.

4. A sheet which comprises a base layer containing a polyethylene terephthalate type resin and a polycarbonate type resin, a surface layer containing a polycarbonate type resin formed on at least one side of the base layer, and a coating layer of an electrically conductive coating formed on at least one side of the surface layer, wherein the base layer contains from 70 to 97 wt% of the

polyethylene terephthalate type resin and from 3 to 30 wt% of the polycarbonate type resin based on the total amount of the polyethylene terephthalate type resin and the polycarbonate type resin, the thickness of the surface layer is from 10 to 30% of the total thickness, and the coating layer has a surface specific resistance within a range of from 10^4 to 10^{14} Ω.

5. The sheet according to Claim 4, wherein the electrically conductive coating contains carbon black and/or an antistatic agent.

6. The sheet according to Claim 5, wherein the antistatic agent is a high polymer antistatic agent.

7. An electronic component packaging container which comprises the sheet as defined in any one of Claims 4 to 6.

8. The electronic component packaging container according to any one of Claims 1, 2, 3 and 7, which is a carrier tape.

9. A packaged product of an electronic component, wherein the electronic component is stored in the carrier tape as defined in Claim 8 and heat-sealed with a cover tape.

DK-177-US
(E1862US)

Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者（下記の名称が複数の場合）であると信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled.

ELECTRONIC COMPONENT PACKAGING CONTAINER

上記発明の明細書は、

the specification of which

☐ 本書に添付されています。

☐ is attached hereto.

☒ ___月___日に提出され、米国出願番号または特許協定条約国際出願番号を_____とし、

☒ was filed on November 27, 2000 as United States Application Number or PCT International Application Number PCT/JP00/08342 and was amended on _____ (if applicable).

☐ （該当する場合）_____に訂正されました。

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37編第1条56項に定義されるとおり、特許資格の有無について重要な情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

Japanese Language Declaration
(日本語宣言書)

私は、米国法典第35編119条（a）-（d）項又は365条（b）項に基づき下記の、米国以外の国の少なくとも一ヵ国を指定している特許協力条約365（a）項に基づく国際出願、又は外国での特許出願もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張している、本出願の前に出願された特許または発明者証の外国出願を以下に、枠内をマークすることで、示しています。

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s) 外国での先行出願			Priority Claimed 優先権主張	
11-337702	Japan	29/November/1999	☒ Yes はい	☐ No いいえ
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)		
			☐ Yes はい	☐ No いいえ
(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)		

☐ 私は、第35編米国法典119条（e）項に基づいて下記の米国特許出願規定に記載された権利をここに主張いたします。

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

(Application No.) (出願番号)	(Filing Date) (出願日)	(Application No.) (出願番号)	(Filing Date) (出願日)

☐ 私は、下記の米国法典第35編120条に基づいて下記の米国特許出願に記載された権利、又は米国を指定している特許協力条約365条（c）に基づく権利をここに主張します。また、本出願の各請求範囲の内容が米国法典第35編112条第1項又は特許協力条約で規定された方法で先行する米国特許出願に開示されていない限り、その先行米国出願書提出日以降で本出願書の日本国内または特許協力条約国際提出日までの期間中に入手された、連邦規則法典第37編1条56項で定義された特許資格の有無に関する重要な情報について開示義務があることを認識しています。

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

PCT/JP00/08342	November 27, 2000	Pending
(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)
(Application No.) (出願番号)	(Filing Date) (出願日)	(Status: Patented, Pending, Abandoned) (現況：特許許可済、係属中、放棄済)

私は、私自信の知識に基づいて本宣言書中で私が行なう表明が真実であり、かつ私の入手した情報と私の信じるところに基づく表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行なえば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Japanese Language Declaration
(日本語宣言書)

委任状：私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。
(弁護士、または代理人の指名及び登録番号を明記のこと)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

022850

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Japanese Language Declaration
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国籍		Citizenship
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（第六またはそれ以降の共同発明者に対しても同様な情報および署名を提供すること。）

(Supply similar information and signature for third and subsequent joint inventors.)